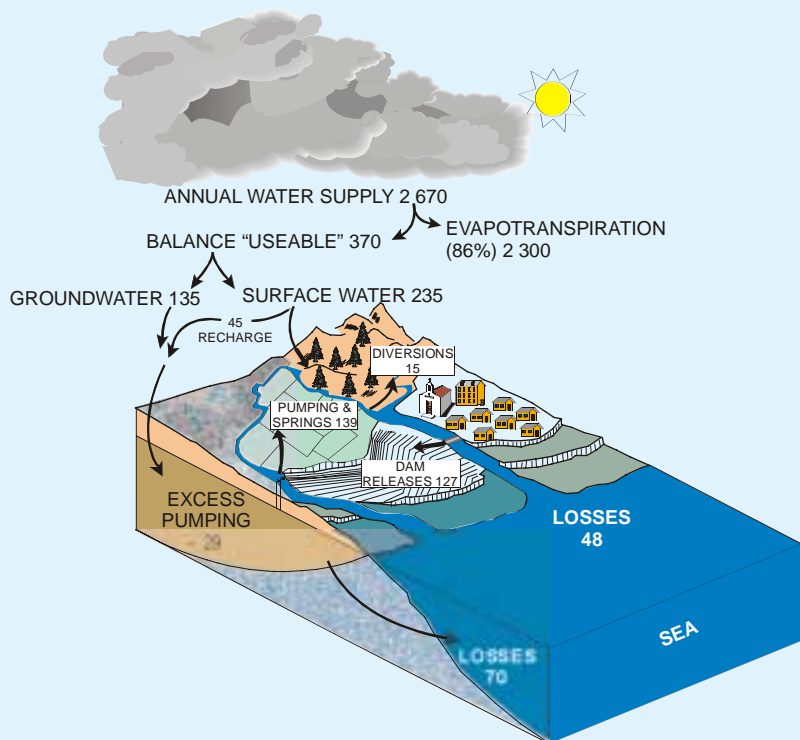


USE AND CONSERVATION OF WATER IN CYPRUS



ALL NUMBERS IN MILLION CUBIC METRES

Water balance for Cyprus (Area under Government control)



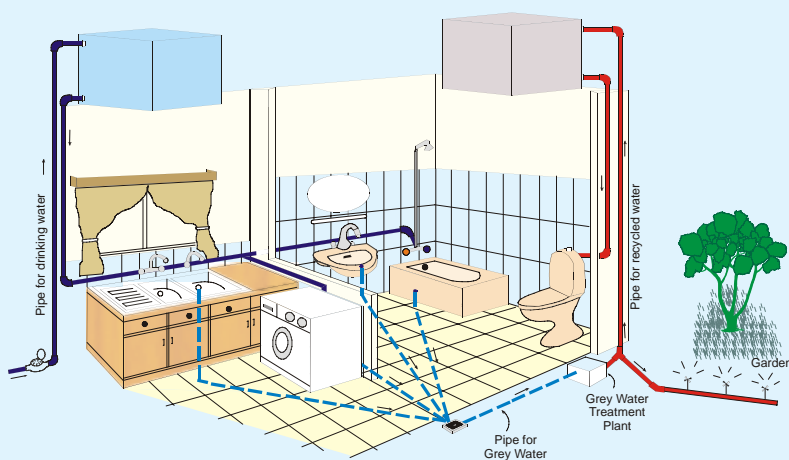
Irrigation at Kokkinokhoria



If your taps are always running, eventually they'll dry up

Conservation of water

RECYCLING OF GREY WATER



Recycling of grey water



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Cover photograph:

- Irrigation at Kokkinokhoria
- Water balance for Cyprus
(Area under Government control)
- Conservation of water
- Recycling of grey water

Back cover photographs:

1. Dhekelia Desalination Plant
2. Limassol Water Treatment Plant
3. The Central Wastewater Treatment Plant at Vathia Gonia

WELCOMING ADDRESS

The enormous importance of water for the social and economic development of mankind and the conservation of our natural environment necessitates the mobilization of all of us, to take the necessary steps for the sustainable development of our natural resources and the raising of public awareness on the rational use of this precious commodity of nature.

The planning, development, management, saving and preservation of this strategic commodity is, after our national problem, the first priority of our government policy.

The water management policy is based on the exploitation of all remaining surface water sources, the exploitation of non-conventional sources of water such as recycled water for irrigation purposes and the enrichment of aquifers, the setting up of a Water Entity and the raising of awareness among the public for the proper use of water. The main pillar of our policy, however, is to eliminate the dependency of the potable water supplied to the large urban and tourist areas, on rainfall with the setting up of desalination plants. The problem of water rationing, which troubled consumers for decades, was finally resolved thanks to the implementation of desalination programmes and other measures adopted by the Government.

The overall government policy will provide satisfactory solutions to all aspects of water supply in Cyprus. However, it should be pointed out that water scarcity, due to growing demands coupled with the marked decline of rainfall attributed to the known climatic changes worldwide, makes the rational use of water and the reduction of wastage imperative.

To the management and staff of the Water Development Department who have contributed in any way towards the preparation of this publication, I express my thanks and sincere congratulations.

Costas Themistocleous
**Minister of Agriculture,
Natural Resources and Environment**

November, 2002

P R E F A C E

The existence of water and life on earth are inextricably linked since without water there can be no life, at least as we know it. The extended shortage of water, the gradual depletion of water resources as well as the exacerbation of the water pollution problems in many regions of our planet, constitute today, a real and serious threat to mankind.

In Cyprus, the issue is serious and demands our immediate attention. Water in Cyprus is a commodity faced with depletion. Presently, water demand for various uses exceeds the amount of water available. During the past decades the problem has been exacerbated due to the observed prolonged periods of reduced precipitation.

Water conservation is imperative. We have the obligation and responsibility to make rational use of water and avoid its wastage. The more water we save today, the greater our chances are to have water in the future. If we waste water today we may be faced with thirst in the future.

This issue is a small contribution to the systematic efforts undertaken by the Water Development Department to reduce water demand through the implementation and support of water saving measures and the raising of water awareness among the public to make proper use of this unique commodity of nature.

This publication also provides information and various other statistical data on the water use in Cyprus.

Christodoulos Artemis
Director
Water Development Department

November, 2002

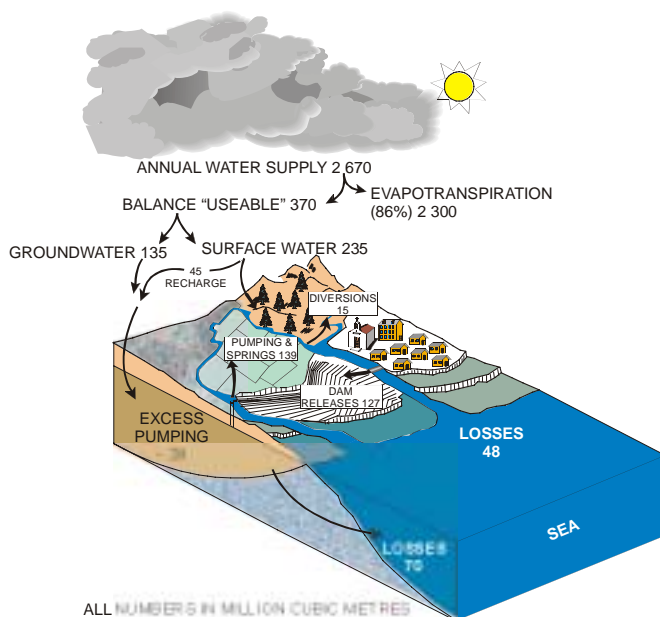
INTRODUCTION

Until recently, all water resources available in Cyprus came from rainfall. Based on a long series of observations, the mean annual precipitation, including snowfall, amounts to approx. 500 millimetres, whereas during the past thirty years (1971-2000) this amount was reduced to 460 millimetres. The amount of water, which corresponds to the total surface of the Government controlled area, totals 2.670 million cubic metres (MCM) whereas only 14% or 370 MCM is available for development since the remaining 86% returns to the atmosphere through evapotranspiration.

Geographically speaking, rainfall is unevenly distributed, with maximum precipitation falling on the two mountainous masses and minimum precipitation observed in the eastern plain and the coastal areas. The variation in rainfall is not only regional but also annual and often two or three consecutive dry years are observed.

The mean annual quantity of 370 MCM of water is distributed between surface and groundwater in the ratio 1,75:1 respectively.

WATER BALANCE FOR CYPRUS (AREA UNDER GOVERNMENT CONTROL)



ALL NUMBERS IN MILLION CUBIC METRES
* Includes aquifer recharge from surface runoff

AREA = 5 800 Km²

AVERAGE ANNUAL RAINFALL = 460 mm (1971-2000)

TOTAL ANNUAL WATER SUPPLY = 2 670 Mm³

86% EVAPOTRANSPIRATION = 2 300 Mm³

BALANCE "USEABLE" = 370 Mm ³	
SURFACE WATER 235	GROUNDWATER 135
Rivers diversions = 15	Pumping } = 139
Aquifer recharge = 45	Springs } = 139
Stored in dams (and used) = 127	Losses to sea = 70
Losses to sea = 48	Excess pumping = -29
235	180*

WATER USE

Domestic use and irrigation are the two main water-consuming sectors in Cyprus. On the basis of conclusions reached within the context of a recent study prepared by the Water Development Department in co-operation with the Food and Agriculture Organization of the United Nations (FAO), provided that all needs are satisfied, agriculture accounts for about 69% of the total water consumption and the domestic sector for 25%. The remaining 6% is used for industrial (1%) and environmental purposes (5%). Usually, the tourist and industrial sectors are included in the domestic sector because the system of water distribution in urban areas is common for all uses. The consumption of water for tourist purposes accounts for about 5% of the total water consumption.

Water for domestic purposes is mainly supplied through the Government water works and is sold on a bulk basis to the Nicosia, Limassol and Larnaca Water Boards, to Municipalities and Community Councils, which, in their turn, undertake its supply to the consumers. Nevertheless, in some cases various communities have their own water supply sources, which they manage themselves.

Water for irrigation purposes is supplied through the Government and non-Government water works. Contrary to the supply of water for domestic use, water for irrigation is distributed to farmers, on a retail basis, through the Government water works and in isolated cases is also provided on a bulk basis to irrigation divisions. The non-Government water works consist of small irrigation schemes, which are managed and operated by irrigation divisions or associations. Moreover, some water quantities from private boreholes are also used for irrigation purposes.



Water from windmills

Groundwater, dams, desalination plants and recycled water are the principal sources of water in Cyprus. In the decade 1920-1930 and



Old methods of pumping water

after the relevant research studies were conducted, the Government started the exploitation of groundwater, which was, then, the main source of water for both domestic and irrigation purposes. By the time of declaration of the Cyprus Republic in 1960 thousands of boreholes had been drilled in all areas of Cyprus and as a result the water reserves in the main aquifers in areas like Famagusta, Morfou and Akrotiri were faced with depletion due to overpumping.

The water problem and its exacerbation over the years, was recognized early enough by the relevant state authorities, which, aided by international organizations, designed a long-term program to combat the problem effectively.



Kouris Dam

Following independence, attention was turned to the systematic study and construction of water development infrastructure, both for storage and recharge purposes, which included the construction of a great number of dams and off-stream reservoirs so as to ensure the long-term use and fair distribution of water on the whole of the island.

Presently, the storage capacity of dams totals 307,5 MCM of water compared to 6 MCM in 1960. Water from dams, is used for domestic and irrigation purposes as well as for recharge purposes.

Despite the impressive results of the water development policy pursued in Cyprus, because of the increasing water demand and the reduction in rainfall due to the climatic changes worldwide and the impact of the green-house effect, the quantities of water available for domestic and irrigation purposes were not sufficient to cover the island's needs. As a result in the past few years water-rationing measures had been introduced which had an adverse impact on agriculture, social life and generally on the economy of the island.



Limassol Water Treatment Plant



Central Distribution Point at Kokkinokhoria

Desalination units were set up to combat this situation with the aim of eliminating the dependency of the potable water supplied to the large urban and tourist centres on rainfall. The first desalination plant commenced operation on 1 April 1997 at Dhekelia, while in April 2001 the second desalination plant, near the Larnaca Airport commenced operation. The new desalination plant near Larnaca Airport, the largest one in Cyprus in this sector, coupled with the Dhekelia plant produce 33 MCM of water a year. This quantity, along with the quantity of water in the dams, constitutes safe quantities for lifting restrictions completely. After many years of hardship caused by the well-known water-rationing

measures, every household in the Government controlled area has, since January 2001, continuous supply of water. Water rationing belongs to the past.

The Government's water policy is not restricted to the issue of the desalination plants alone but is also focused on the exploitation of other non-conventional water sources such as recycled water, which replaces equal quantities of good quality water. Recycled water, which results from the treatment of wastewater, is used for irrigation purposes and the enrichment of aquifers. Nevertheless, the full exploitation of wastewater is a long and costly procedure.



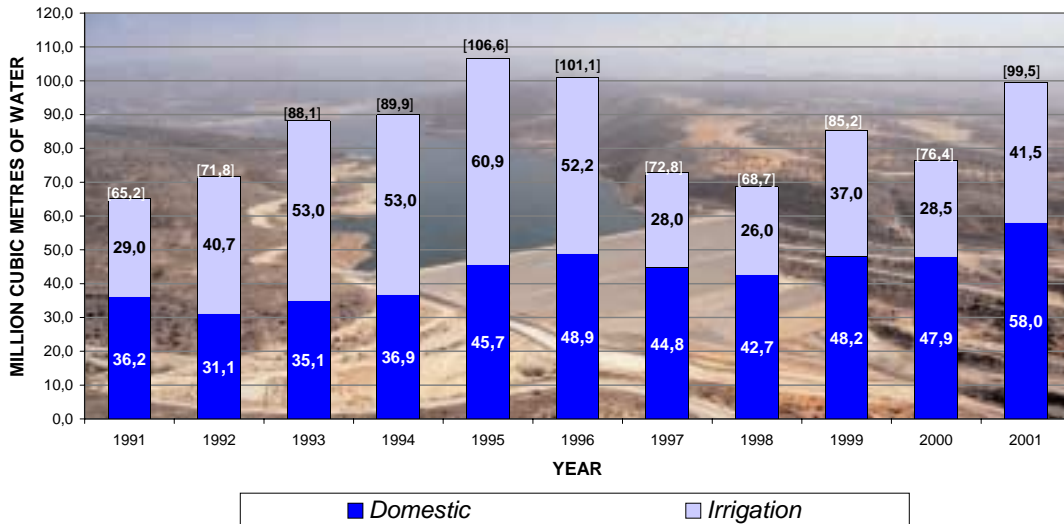
Dhekelia Desalination Plant



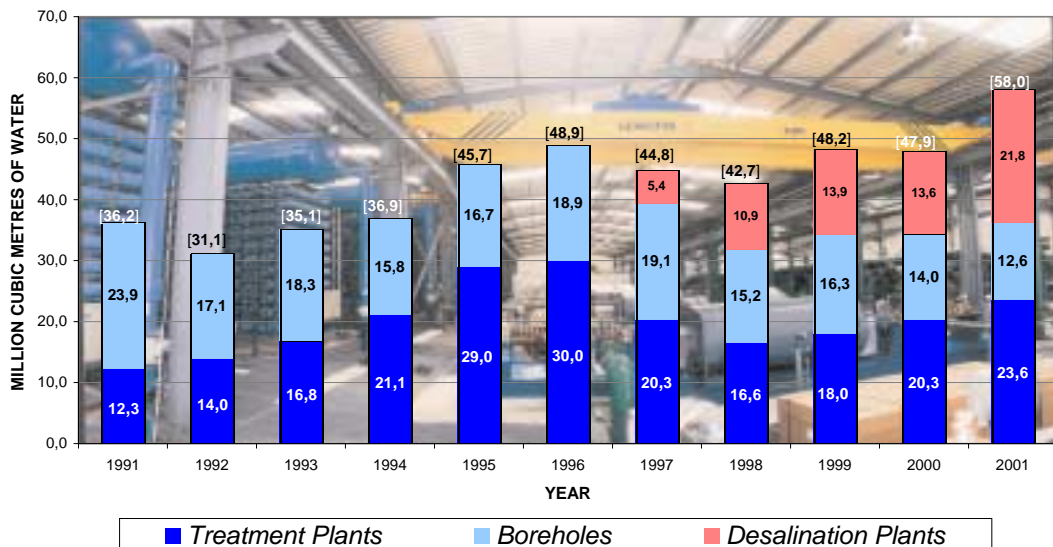
The Central Wastewater Treatment Plant at Vathia Gonia

STATISTICS

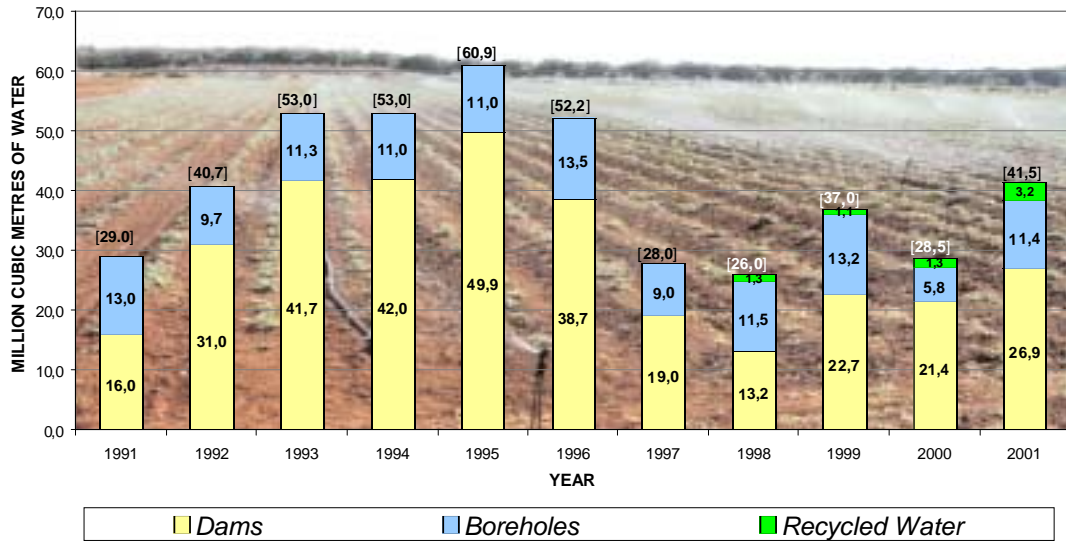
SUPPLY OF WATER FROM THE GOVERNMENT WATER WORKS DURING THE PERIOD 1991 - 2001



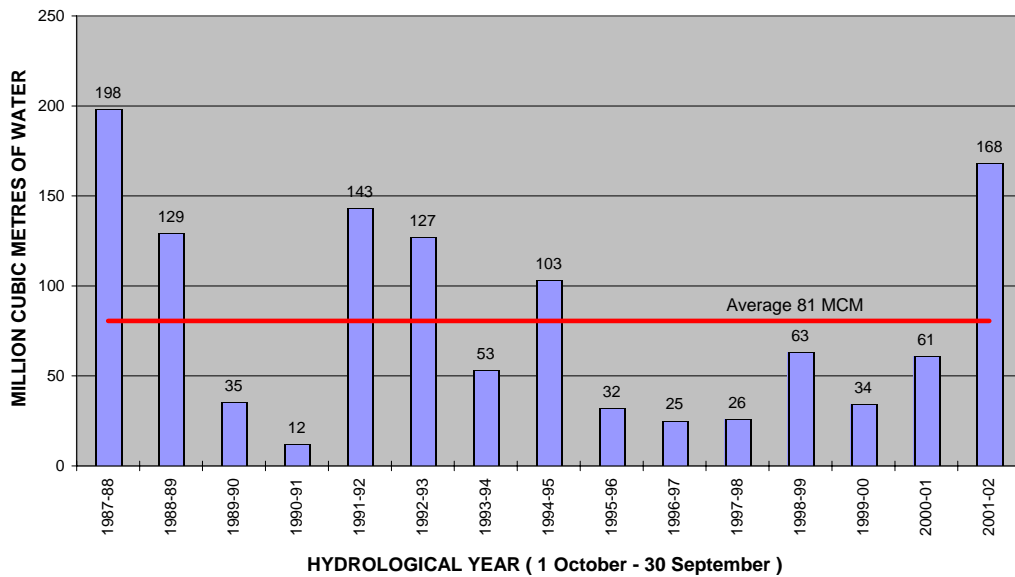
GOVERNMENT WATER WORKS - DOMESTIC SUPPLY SOURCES DURING THE PERIOD 1991 - 2001



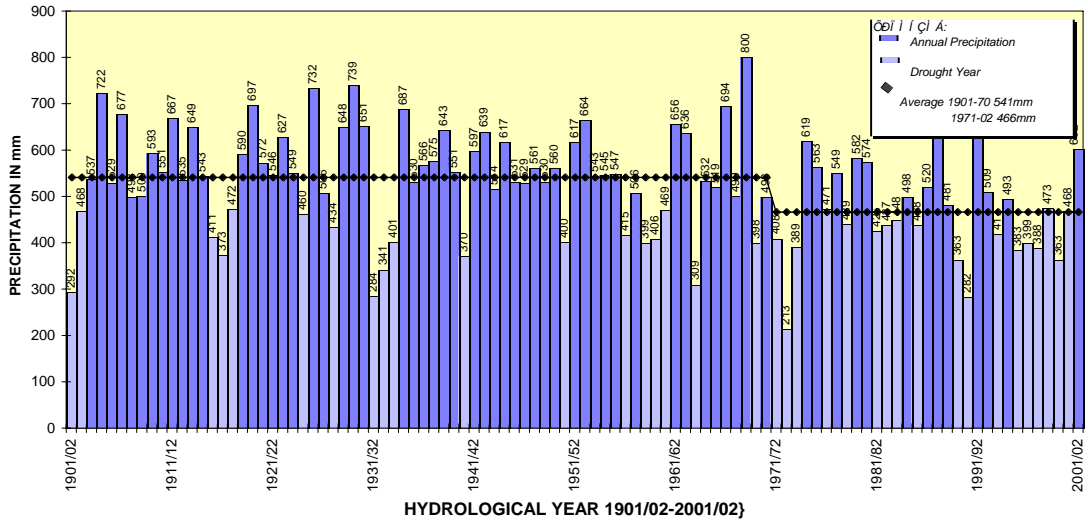
GOVERNMENT WATER WORKS - IRRIGATION SUPPLY SOURCES DURING THE PERIOD 1991 - 2001



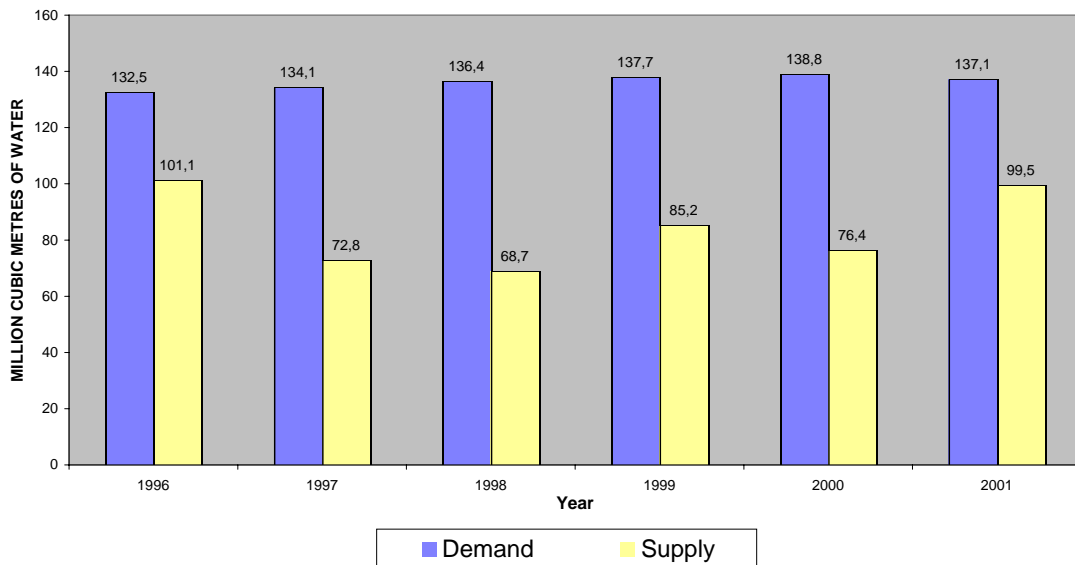
**GOVERNMENT WATER WORKS
INFLOW OF WATER TO THE DAMS 1987 - 2002**

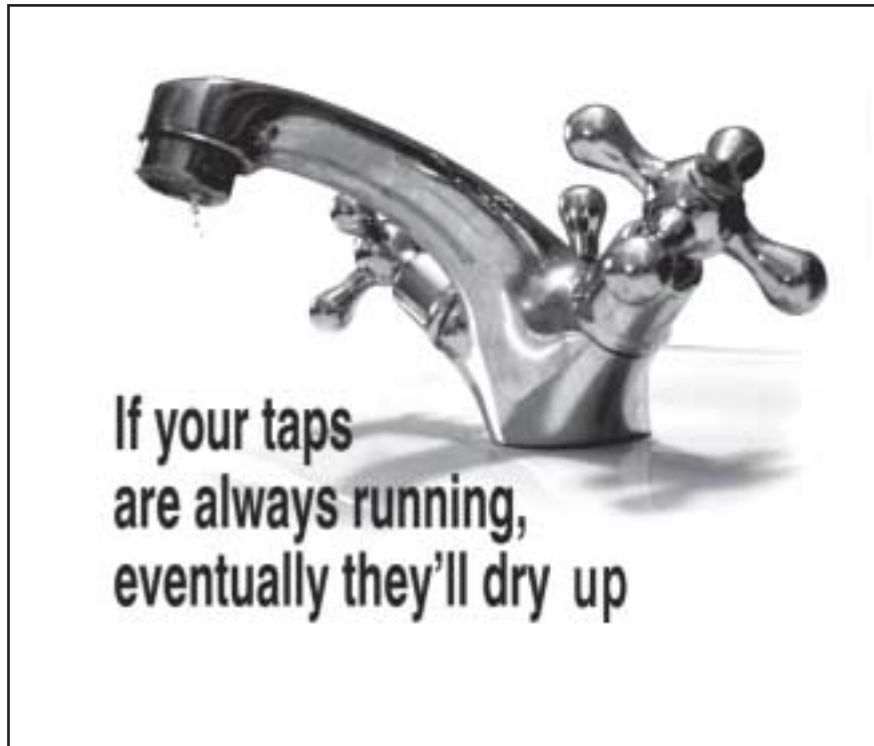


**CYPRUS' ANNUAL PRECIPITATION AND AVERAGE 1901/1970-1971/2002
(AREA UNDER GOVERNMENT CONTROL)**



**GOVERNMENT WATER WORKS
WATER DEMAND AND SUPPLY BALANCE 1996 - 2001**





WATER CONSERVATION

The prolonged periods of drought and reduced rainfall that are often observed lead to a dramatic reduction of the island's available water reserves and create problems in all areas of economic activity.

We must all become aware of the fact that water, this fundamental element of life, is scarce not only in Cyprus but in many other countries as well and it is the obligation and responsibility of us all to pursue its efficient management and undertake all necessary measures to save it.

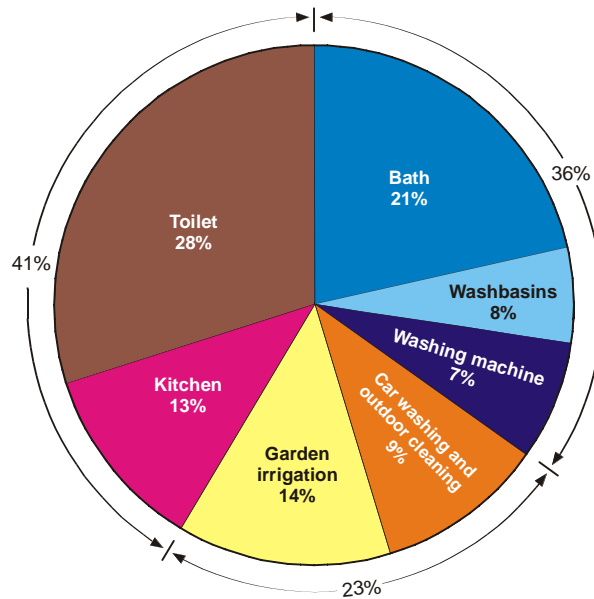


Effects of drought

The potential for water conservation is great. The public is encouraged to observe the following recommendations to ensure the best possible use of every drop of water available.

WATER-SAVING RECOMMENDATIONS TO CONSUMERS

1. *Repair any defective plumbing installations, taps, toilet cisterns etc. immediately.*
2. *Check the water meter regularly to identify early any leaks.*
3. *Regulate the toilet cisterns or place a plastic bottle full of sand in them to ensure the use of the least possible amount of water.*
4. *Install devices in new buildings, lavatories etc. which use lesser amounts of water.*
5. *Take a shower instead of filling the bath tub and do not leave the tap running whilst washing.*
6. *Do not allow children to play by wasting water.*
7. *Do not let the water run whilst brushing your teeth or whilst shaving.*
8. *Do not leave the tap running whilst washing the dishes.*
9. *Wash fruit in a bowl and use the same water to water the flowers.*
10. *Operate the washing machine and dishwasher only when they are full.*
11. *Clean the verandas, yards, pavements and other exterior areas with the mop and avoid using a lot of water.*
12. *Wash your car with a sponge and a bucket of water and don't use a hose.*



Average consumption of water in a household

WATER-SAVING RECOMMENDATIONS TO FARMERS

1. *Install efficient irrigation systems for your crops.*
2. *Water your crops early in the morning or late in the afternoon and wherever possible during the night when there are no strong winds blowing.*
3. *Store the rainwater falling on the roofs of your green houses in earth filled reservoirs with plastic lining and use this water as a supplement for your irrigation needs.*
4. *Destroy the weeds in your crops early.*
5. *Take all appropriate measures to avoid leaks in pipes and irrigation systems.*
6. *Plant less water intensive crops.*

GOVERNMENT SUBSIDIES

The government implements an efficient and practical policy of subsidies for water-saving purposes.

SUBSIDY FOR BOREHOLES

The subsidy for boreholes is granted to make use of their water for the irrigation of gardens in plots connected to the municipal water supply systems, and which in turn the Water Boards or the Government Water Works supply with water.

The subsidy applies to new boreholes and is granted to all applicants who meet the following requirements:

1. Obtain a borehole license from the District Officer (all those interested may obtain the relevant application forms at the District Office).
2. The place where the borehole is to be drilled must first be inspected by the Water Development Department. (The inspection is carried out after the submission of the application to the District Office and before drilling the borehole).
3. The borehole must be drilled by a person with a license. (Applicants may be furnished with a list of licensees at the Head or District Offices of the Water Development Department).

The subsidy amounts to CY£100 and is granted after the borehole has been drilled and upon filling in the relevant form.



Drilling rig

SUBSIDY FOR THE INSTALLATION OF A SYSTEM FOR THE RECYCLING OF GREY WATER

The purpose of the installation of the aforesaid system is the treatment of grey water and its reuse in lavatories and for the irrigation of gardens of houses where grey water is produced. Grey water is the water from baths, showers, washbasins, washing machines and from the washing of fruit and vegetables. More than 33% of water is saved through the recycling of grey water. Thus, the amount of potable water saved by every three persons covers the water needs of a fourth one.

The above subsidy covers the installation of the system of recycling of grey waters in houses, schools, playgrounds, institutions, swimming pools, gyms, hotels, industrial units etc., which are connected to the municipal and communal water supply systems in Cyprus.

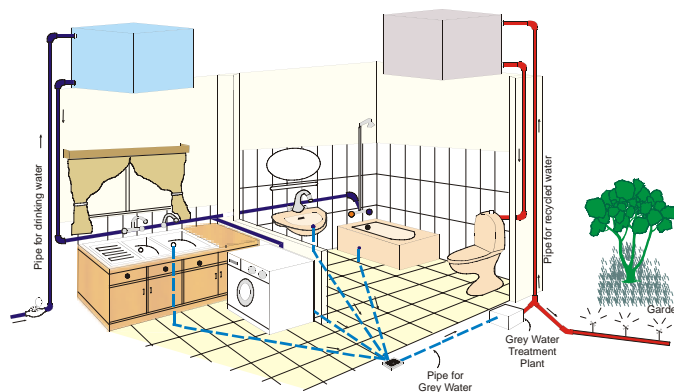
The subsidy is granted upon fulfilment of the following conditions:

1. All those interested must first file an application with the Director of the Water Development Department before any work is carried out for installation of the system (the relevant application form may be obtained at the Head or District Offices of the Department).

2. The sewage system of the building must first be inspected by the officers of the Water Development Department who will give the necessary technical advice for the installation of the recycling system (the inspection is carried out after submission of the application and prior to installation of the system).
3. Installation of the recycling system (upon an approval obtained by the Water Development Department).
4. The subsidy is granted after the system has been installed and inspected by the officers of the Water Development Department (who must be notified by the applicants to this effect). The officers must make sure that the installation has been carried out in accordance with the directions of the Department.

The subsidy granted to every house amounts to CY£200 whereas for all other buildings the subsidy covers 20% of the cost including the installation of the system.

RECYCLING OF GREY WATER



Recycling of grey water

SUBSIDY FOR THE CONNECTION OF BOREHOLES WITH LAVATORIES

This subsidy covers the connection of boreholes with the lavatories of houses, schools, office premises, shops, institutions etc., which are connected to the municipal and communal water supply systems in Cyprus.

The purpose of such a connection is to save the potable water (up to 28%) used in lavatories.

The subsidy refers to new connections of boreholes with lavatories and is granted upon fulfilment of the following conditions:

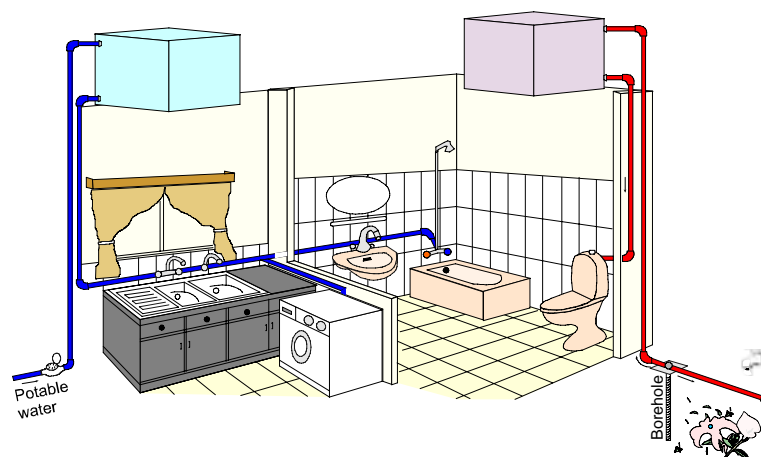
1. The applicant must file an application with the Director of the Water Development Department prior to the commencement of any connection works (all those interested may be provided with an application form at the Head or District Offices of the Water Development Department).
2. The existing borehole must first be inspected by the officers of the Water Development Department who must also give the technical advice necessary for the method of connection of the borehole with the system (the inspection is carried out after submission of the application and prior to the installation).

3. The borehole is then connected with the lavatories (the connection is subject to approval by the Water Development Department).

4. The subsidy is granted after installation of the connection and after its inspection by the officers of the Water Development Department (who must be notified by the applicants to this effect). The officers must make sure that the connection has been carried out in accordance with the Department's instructions.

The subsidy for every house/office premises/shops, institutions etc. amounts to:

- a. CY£100 where the borehole is connected with one or two houses/offices/shops.
- b. CY£80 where the borehole is connected with three and up to five houses/offices/shops.
- c. CY£70 where the borehole is connected with more than five houses/offices/shops.
- d. CY£30 for every point of water supply installed at institutions, schools etc.



Connection of boreholes with lavatories

- ***The more water we save today, the greater our chances are to have water in the future.***
- ***If we waste water today we may be faced with thirst in the future.***



WATER IS SCARCE, SAVE IT



USE EFFICIENT IRRIGATION SYSTEMS FOR THE PROPER USE OF WATER



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